Claim(s)

1.   A method of creating a pattern for a mask adapted for use in lithographic production of layout features on a substrate, comprising:

   providing a design mask pattern of the design layout;

5   providing a predicted layout pattern from said design mask pattern;

   providing yield curves based upon the distance between sampling points at corresponding edge feature positions of said design mask and predicted layout pattern; and

   determining yield values for edge feature positions of said predicted

10   layout pattern.

2.   The method as set forth in Claim 1 wherein sampling is terminated for any edge feature positions of said predicted layout pattern that provides acceptable yield results as determined by said yield curves.

3.   A method of creating a mask adapted for use in lithographic production

15   of layout features on a substrate, comprising:

   providing a design mask pattern of the design layout pattern to be created on the substrate;

   providing a predicted layout pattern from the design mask pattern of what would be created on said substrate using said design mask pattern;

successively sampling selected points of related contour edge features across said predicted layout pattern and said design mask pattern to determine distance values between respective ones of said contour edge features;

providing yield curves as a function of said distance values between said

5   contour edge features;

determining from said yield curves for each selected sampling point whether the current position of the contour edge feature of said predicted layout pattern is at a position that provides acceptable yield; and

incrementally moving the said current position of contour edge feature of

10   said predicted wafer layout pattern toward an edge position of improved yield.

4.   The method as set forth in Claim 3 wherein when said step of determining whether the current position of the contour edge feature of said predicted layout pattern is at a position that provides an acceptable yield, the sampling for this position location is removed from said selected sampling

15   points.

5.   The method as set forth in Claim 3 wherein when said step of determining whether the current position of the contour edge feature of said predicted layout pattern is at a position within acceptable proximity of said corresponding edge position of said design pattern without providing

20   acceptable yield said current position location is marked as a failed yield location.

6.   The method as set forth in Claim 3 wherein said distance values include the value of the width of a pair of metal lines and the distance between said metal lines and said yield function is represented by a family of yield curves that are a function of the width of said metal lines and the distance

5   therebetween.

7.   The method as set forth in Claim 6 wherein said yield function is represented by single yield curve that is a function of the distance between said current position of contour edge feature of said predicted wafer layout pattern and the corresponding edge position of said design pattern.

10   8.   The method as set forth in Claim 3 wherein said yield function is represented by a single yield curve that is a function of the distance of movement of the design edge from its original design position.

9.   The method as set forth in Claim 3 wherein said yield function is represented by a family of lithography limited yield curves of a metal layer

15   process that are a function of the values of linewidth and spacewidth using process window conditions and control of dose and focus.

10.   The method as set forth in Claim 3 wherein said yield function is represented by a single yield curve that is a function of the distance between metal line edge and a fixed point on the interlevel contact.

11.   The method as set forth in Claim 3 wherein said yield function is represented by a family of yield curves that are a function of the displacement distance of the edge of a gate from the design position and the distance to the edge of RX.

5   12.   A system for creating a mask adapted for use in lithographic production of layout features on a substrate, comprising:

storage means for storing a design mask pattern of the design layout pattern to be created on the substrate;

storage means for storing a predicted layout pattern from the design
10   mask pattern of what would be created on said substrate using said design mask pattern;

processor means for successively sampling selected points of related contour edge features across said predicted layout pattern and said design mask pattern to calculate the distance values between respective ones of said
15   contour edge features;

storage means for storing information representing yield curves as a function of said distance values between said contour edge features;

processor means for determining from said stored information representing yield curves whether for each selected sampling point the current
20   position of the contour edge feature of said predicted layout pattern is at a position that provides acceptable yield; and

processor means for incrementally moving the said current position of contour edge feature of said predicted layout pattern toward an edge position of improved yield.

13. The system as set forth in Claim 12 wherein when said processor means for determining from said stored information representing yield curves that the current position of the contour edge feature of said predicted layout pattern is at a position that provides acceptable yield, said processor means terminates

5   sampling from the location position.

14. The system as set forth in Claim 12 wherein when said processor means for determining operates to determine that the current position of the contour edge feature of the predicted layout pattern is at a position within acceptable proximity to said corresponding edge position of said design layout pattern

10   without having reached acceptable yield, said processor means marks said current location as a failed yield location and terminates sampling from the location position.

15. The system as set forth in Claim 12 wherein said distance values include the value of the width of a pair of metal lines and the distance between said

15   metal lines and said stored information representing said yield function represents a family of yield curves that are a function of the width of said metal lines and the distance therebetween.

16. The system as set forth in Claim 15 wherein said stored information representing said yield function represents a single yield curve that is a

20   function of the distance between said current position of contour edge feature

of said predicted layout pattern and the corresponding edge position of said design pattern.

17.   The system as set forth in Claim 12 wherein said stored information representing said yield function represents a single yield curve that is a
5   function of the distance of movement of the design edge from its original design position.

18.   The method as set forth in Claim 12 wherein said stored information representing said yield function represents a family of lithography limited yield curves of a metal layer process that are a function of the values of linewidth
10   and spacewidth using process window conditions and values of dose and focus.

19.   A computer program product for creating a pattern for a mask adapted for use in lithographic production of integrated circuits on a semiconductor substrate, the mask pattern being of a layout to be created on the substrate
15   using the mask, said computer program product having:
           computer readable program code means determining the distance values between corresponding edge features on a predicted layout pattern derived from a design layout pattern and on said design layout pattern;
           computer readable program code means for establishing information
20   representing yield curves based upon said distance values; and
           computer readable program code means for comparing distance values related to edge features at selected locations on said predicted layout pattern

with corresponding values on said yield curves to determine the yield for such selected locations.

20.   A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform method steps for

5   creating a pattern for a mask adapted for use in lithographic production of integrated circuits on a semiconductor substrate, the mask pattern being of a design layout pattern to be created on the substrate using the mask, said method steps comprising:

determining the distance values between corresponding edge features on

10   a predicted layout pattern derived from said design layout pattern and on said design layout pattern;

establishing information representing yield curves based upon said distance values; and

comparing distance values related to edge features at selected locations

15   on the said predicted layout pattern with corresponding values on said yield curves to determine the yield for such selected locations.